

WHAT IS CLAIMED IS:

1. A control apparatus for an electric railcar, comprising:
  - an electric power converter for driving a motor;
  - 5 a means for detecting the rotational speed of said motor; and
  - such a control means for said electric power converter that provides control so that when the rotational speed of said motor decreases below the required value, the torque 10 of said motor will decrease at the required rate of change, wherein said control apparatus is characterized in that it further has
  - 15 a means for providing control so that when the rotational speed of said motor reaches the speed region of the required speed or less during retardation, the torque of said motor will be smaller than the specified torque value existing when the rotational speed of said motor decreases below the required value; and
  - 20 a means for providing control so that the carrier frequency at which PWM signals are created during the control of the switching elements constituting said electric power converter will be lower than the carrier frequency existing when the rotational speed of said motor decreases below the required value.
- 25 2. A control apparatus for an electric railcar, comprising:

an electric power converter for driving a motor;  
a means for detecting the rotational speed of said motor;

and

such a control means for said electric power converter  
5 that provides control so that when the rotational speed  
of said motor decreases below the required value, the torque  
of said motor will decrease at the required rate of change,

10 wherein said control apparatus is characterized in that  
it further has a means for providing control so that when  
the rotational speed of said motor reaches the speed region  
of the required speed or less during retardation, the torque  
of said motor will be smaller than the specified torque  
value existing when the rotational speed of said motor  
decreases below the required value.

15 3. A control apparatus for an electric railcar,  
comprising:

an electric power converter for driving a motor;

a means for detecting the rotational speed of said motor;

and

20 such a control means for said electric power converter  
that provides control so that when the rotational speed  
of said motor decreases below the required value, the torque  
of said motor will decrease at the required rate of change,

25 wherein said control apparatus is characterized in that  
it further has a means for providing control so that when

the rotational speed of said motor decreases below the required value, the carrier frequency at which PWM signals are created during the control of the switching elements constituting said electric power converter will be lower  
5 than the carrier frequency existing when the rotational speed of said motor decreases below the required value.